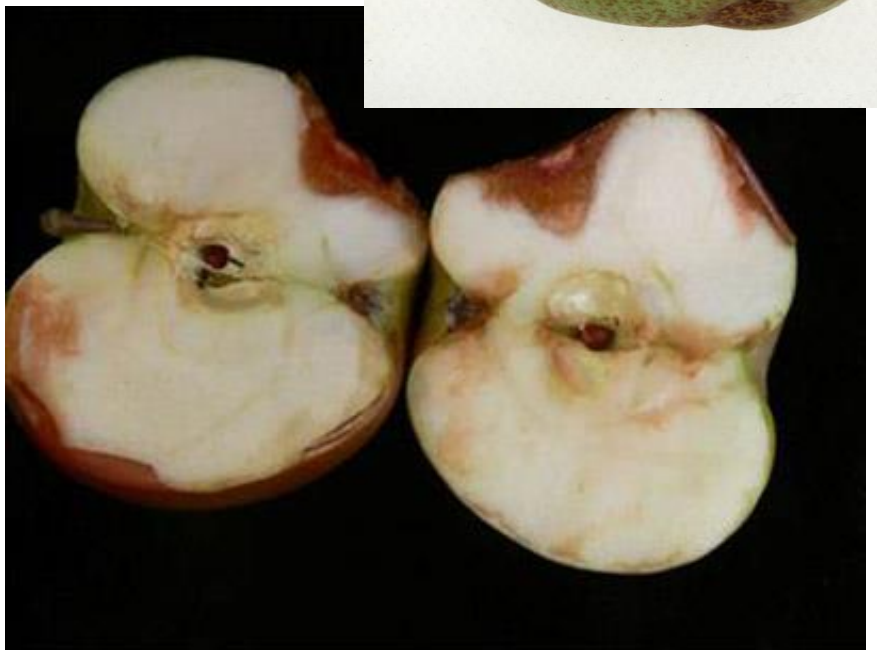
Bitter rot (ABR) & Glomerella leaf spot (GLS) delle pomacee

R.Bugiani

Sintomi

- Piccole macchie fogliari color porpora che si estendono, con forma irregolare. Le foglie ingialliscono e cadono prematuramente.
- ➨Comparsa sui frutti di piccole lesioni brune, rotondeggianti che in prossimità della raccolta si accrescono dando origine a marciumi anulari, talvolta circondati da un alone rossastro. Sulle lesioni si formano masserelle cerose rosate costituite dai conidi del fungo, disposti in cerchi concentrici.

- ➨Le lesioni si approfondiscono nella polpa assumendo una forma a cuneo. I frutti colpiti possono cadere anticipatamente oppure mummificano rimanendo attaccati alla pianta.
- ➨I medesimi sintomi sui frutti possono comparire anche in post-raccolta, durante la conservazione in magazzino.



Colletotrichum gloeosporioides – Biologia ed epidemiologia

- Si conserva nei mesi invernali sui frutti infetti caduti a terra o mummificati rimasti sulla pianta, nelle fessurazioni della corteccia, sui cancri causati da altre malattie e sui rami secchi (anche potature non rimosse), sotto forma di periteci della forma perfetta (*Glomerella cingulata*) e acervuli della forma agamica (*Colletotrichum gloeosporioides*).
- Le infezioni sono causate dalle ascospore e dai conidi, rilasciati per tutto il periodo vegetativo in concomitanza di eventi piovosi e diffusi tramite il vento e l'acqua.
- Condizioni favorevoli alle infezioni sono: frutti prossimi alla maturazione, periodi caldo umidi (UR prossima alla saturazione) e temperature di >26°C.
- Varietà di melo suscettibili: Golden delicious, Honey-crisps, Gala

Conidi di Colletototrichum gloeosporioides

Glomerella fructicola

First Report of *Colletotrichum fructicola* Causing Apple Bitter Rot in Eur

P. Nodet[1], M. Chalopin[1], X. Crété[2], R. Baroncelli[3], G. Le Floch[1]
[1] Laboratoire Universitaire de Biodiversité et Ecologie Microbienne, IBSAM,
Université de Brest, EA 3882, Technopôle Brest-Iroise, 29280 Plouzané, Franc
[2] SUDEXPE - Site de Marsillargues, Mas de Carrière, 34590 Marsillargues, Fr
[3] Instituto Hispano-Luso de Investigaciones Agrarias (CIALE), University of S
Calle del Duero 12, 37185 Villamayor (Salamanca), Spain

Bitter rot is one of the prevalent diseases of apple (*Malus pumila* Mill.) worldv
disease affects the fruit pre-harvest in orchards and/or post-harvest in storage,
considerable economic losses. Until recently the reported causal agents in Eur
the *Colletotrichum acutatum* species complex (Baroncelli et al. 2014; Nodet et
however, species belonging to *C. gloeosporioides* species complex were repor
(Munir et al. 2016), South America (Velho et al. 2018), Korea (Park et al. 201
recently in Belgium (Grammen et al. 2018). In September 2017, bitter rot sym
observed on apple fruit (cultivars Joya Cripps Red, Granny Smith, and Pink La
orchards in the region of Occitanie in France. The rot began as circular brown
mm in diameter, which enlarged rapidly (e-Xtra 1).

Disease Note

Diseases Caused by Fungi and Fungus-Like Organisms

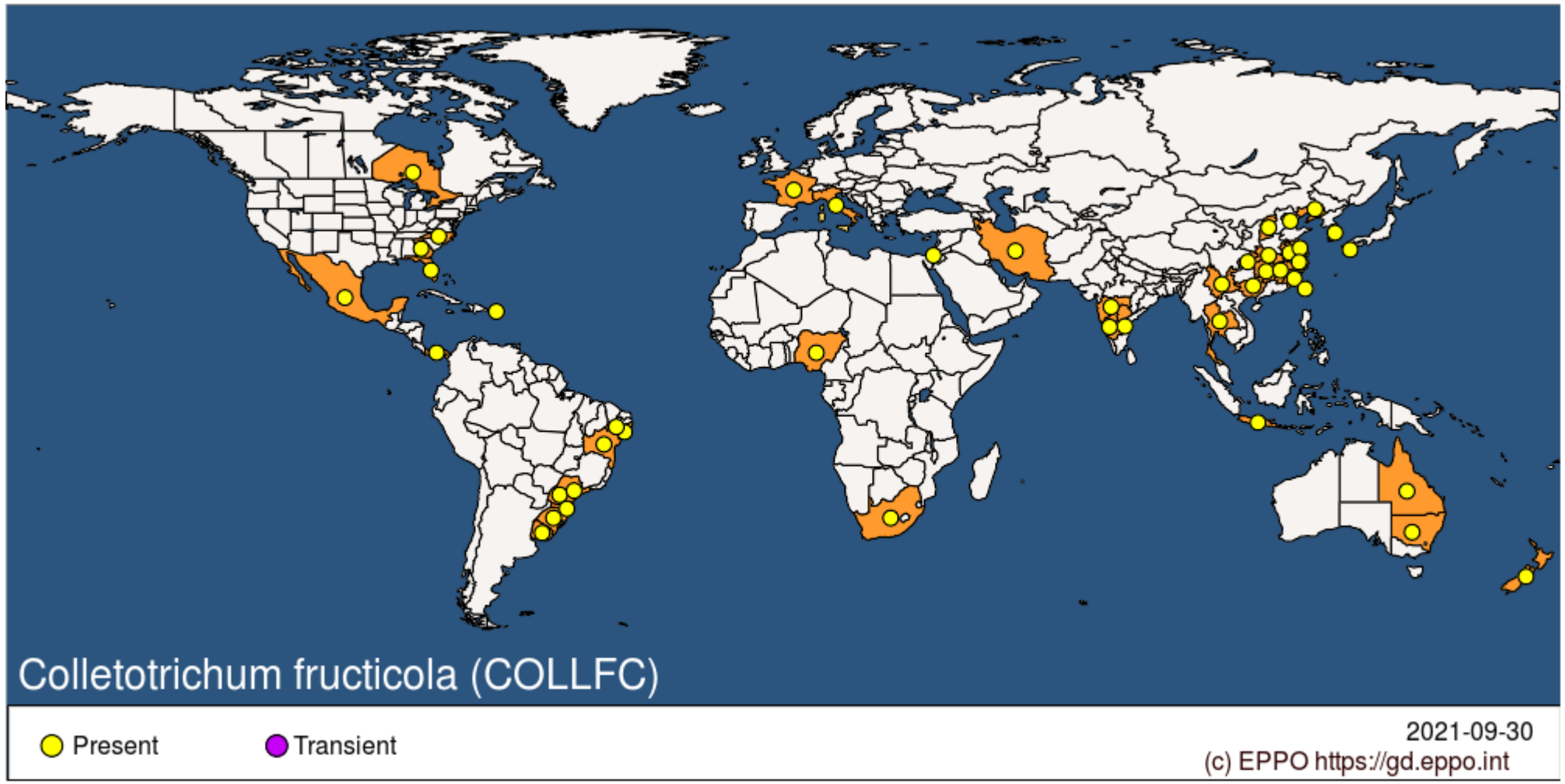
First Report of Preharvest Fruit Rot of 'Pink Lady' Apples Caused by *Colletotrichum fructicola* in Italy

M. Wenneker,† K. T. K. Pham, E. Kerkhof, and D. O. C. Harteveld

Wageningen University and Research, Business Unit Field Crops, 6670 AE Zetten, The Netherlands

Plant Dis. 0:1, 2021; published online as https://doi.org/10.1094/PDIS-11-20-2404-PDN. Accepted for publication 5 January 2021.

In late summer 2019, a severe outbreak of fruit rot was observed in commercial 'Pink Lady' apple orchards (>20 ha in total) in the region Emilia-Romagna (Northern Italy). The symptoms on the fruit appeared as small circular red to brown lesions. Disease incidences of over 50% of the fruits were observed. To isolate the causal agent, 15 affected apples were collected, and small portions of fruit flesh were excised from the lesion margin and placed on potato dextrose agar (PDA). The plates were incubated at 20°C in the dark, and pure cultures were obtained by transferring hyphal tips on PDA. The cultures showed light to dark gray, cottony mycelium, with the underside of the culture being brownish and becoming black with age. Conidia (n = 20) were cylindrical, aseptate, hyaline, rounded at both ends, and 12.5 to 20.0 × 5.0 to 7.5 µm. The morphological characteristics were consistent with descriptions of *Colletotrichum* species of the *C. gloeosporioides* species complex, including *C. fructicola* (Weir et al. 2012). The identity of two representative isolates (PinkL2 and PinkL3) from different apples was confirmed by means of multilocus gene sequencing. Genomic DNA was extracted using the LGC

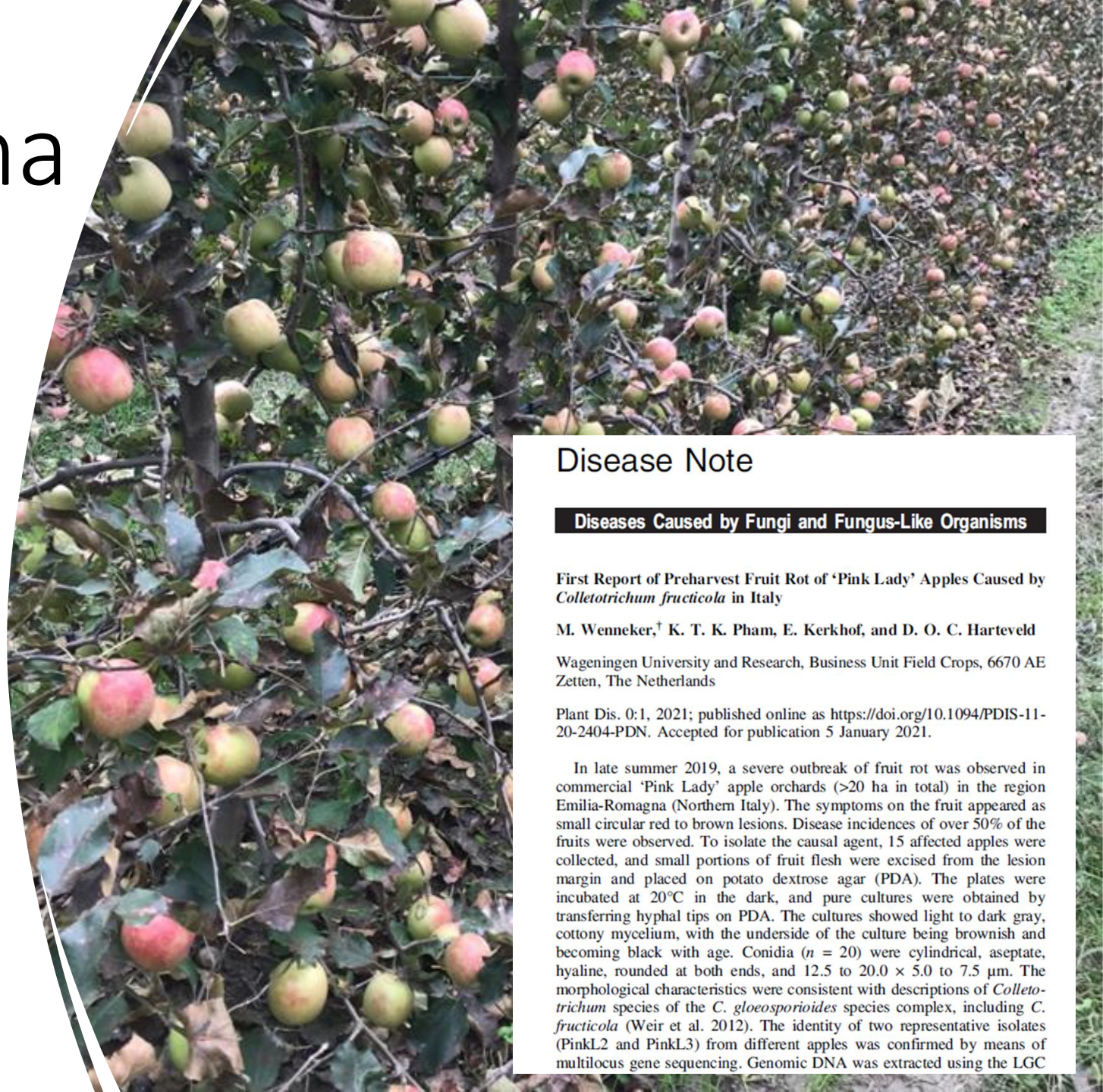

Colletotrichum fructicola (COLLFC)
Present
Transient
2021-09-30
(c) EPPO https://gd.eppo.int

SINTOMATOLOGIA

Puntinature porpora – macchie necrotiche fogliari - Defogliazione precoce - Bitter rot sui frutti

GLS in E-Romagna

- Prima segnalazione nel 2019 in Emilia-Romagna e Veneto. Ricomparsa nel 2023, mentre nel 2020, 2021, 2022, non si era manifestata con virulenza (influenza del regime pluviometrico). **In espansione nel 2023**.
- Intense **defogliazioni** a partire da cv Gala, Granny Smith, Pink Lady.
- **Marciumi lenticellari dei frutti** (Gala, Pink Lady, Story Inored, Esmeralda),
- Condizioni climatiche favorevoli sono caratterizzate da piogge intense e temperatura elevate).



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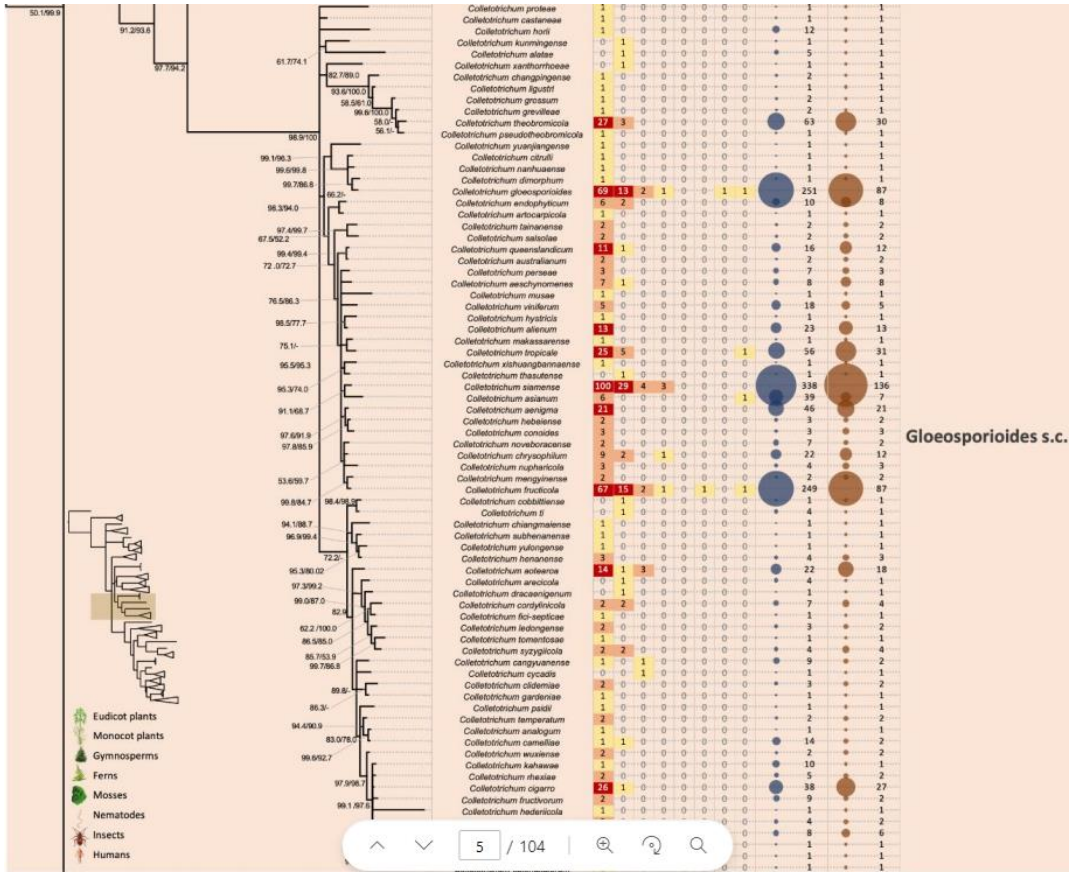
GLS (Glomerella Leaf Spot)

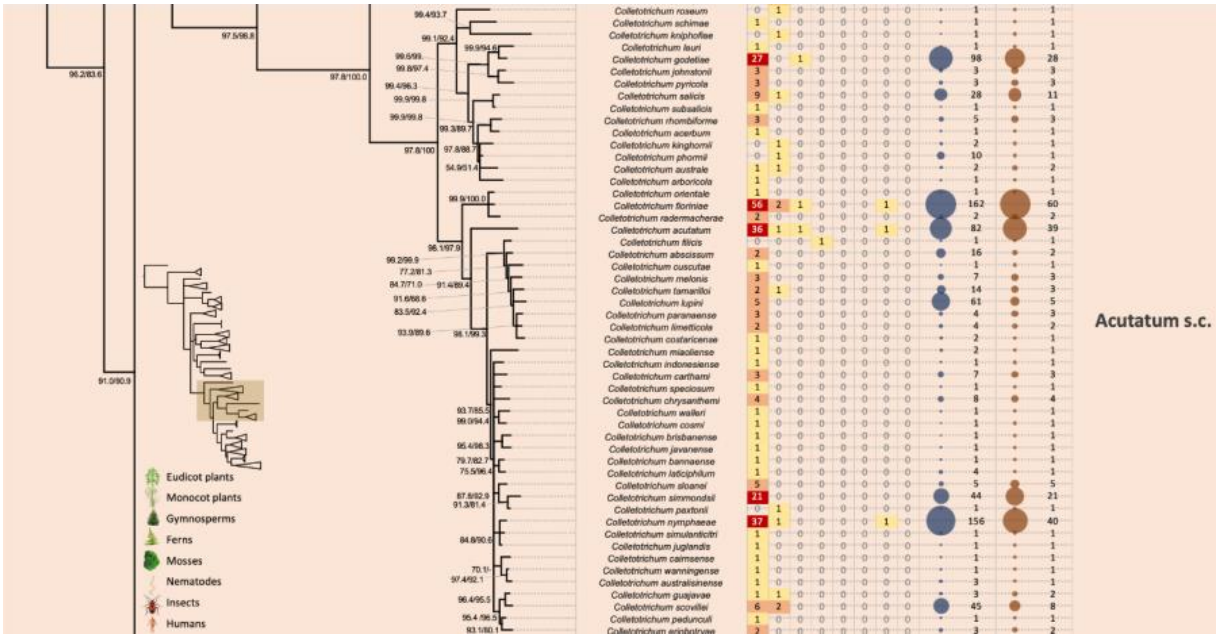
SITUAZIONE GLS NORD ITALIA

Diffusione: * bassa; ** Media; *** Elevata

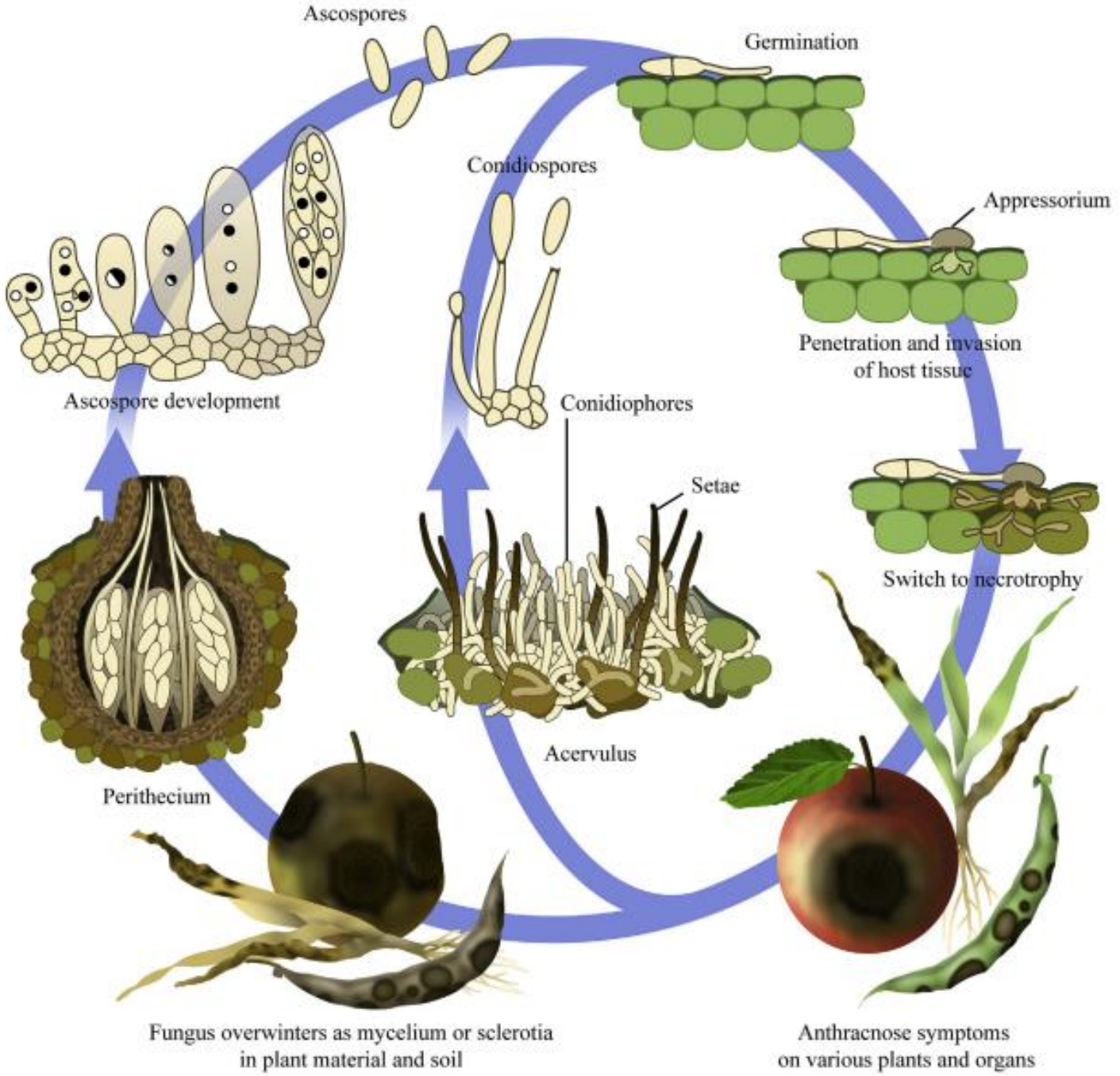
Anni	2019	2020	2021	2022	2023
E-Romagna	**				***
Piemonte				*	***
Prov. Aut. Bolzano		*		**	***
Prov. Aut. Trento				**	
F.V. Giulia		*		*	***
Veneto	*	**		**	***
Lombardia					

GLS (Glomerella Leaf Spot)





Ciclo biologico



Habitus

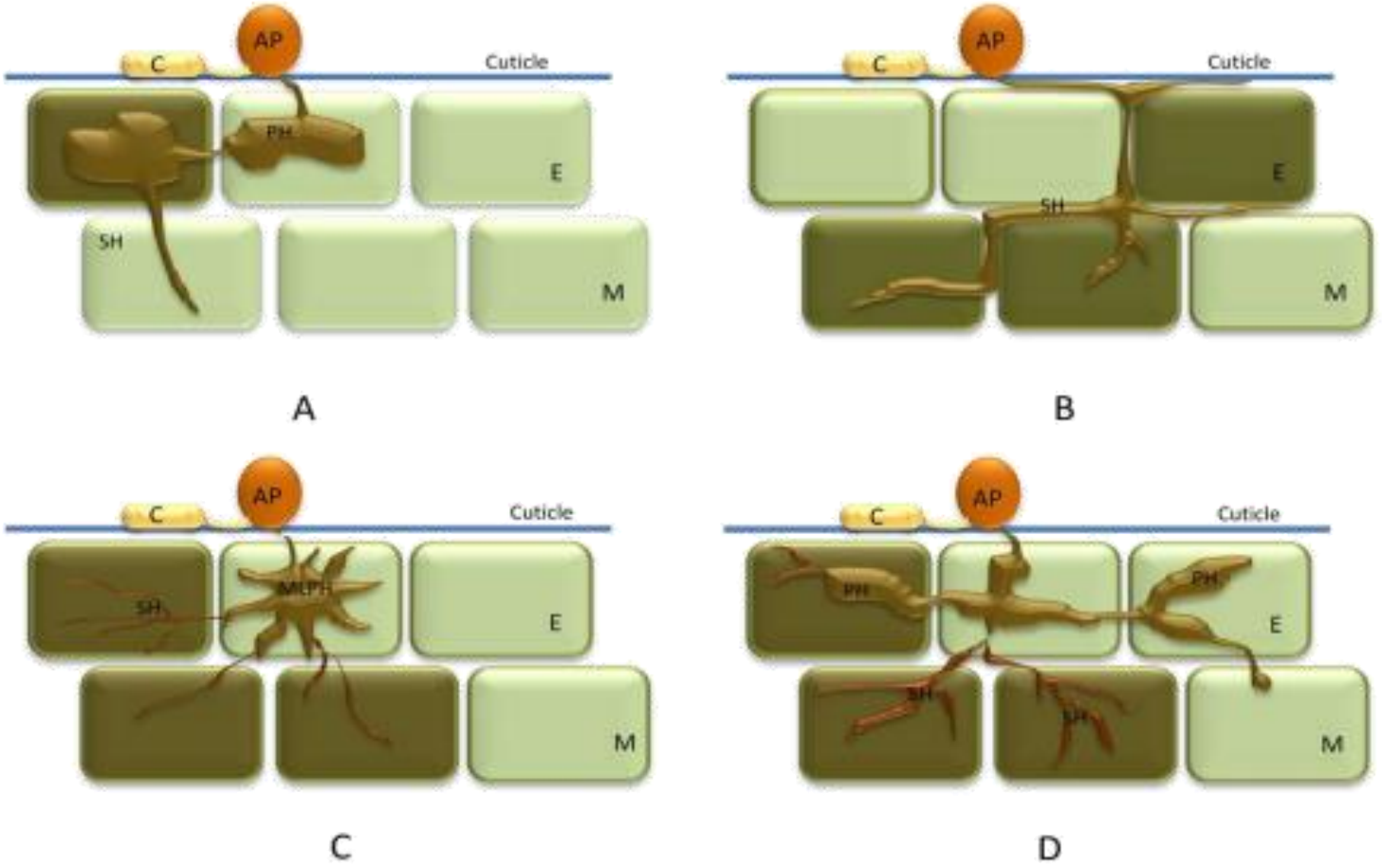
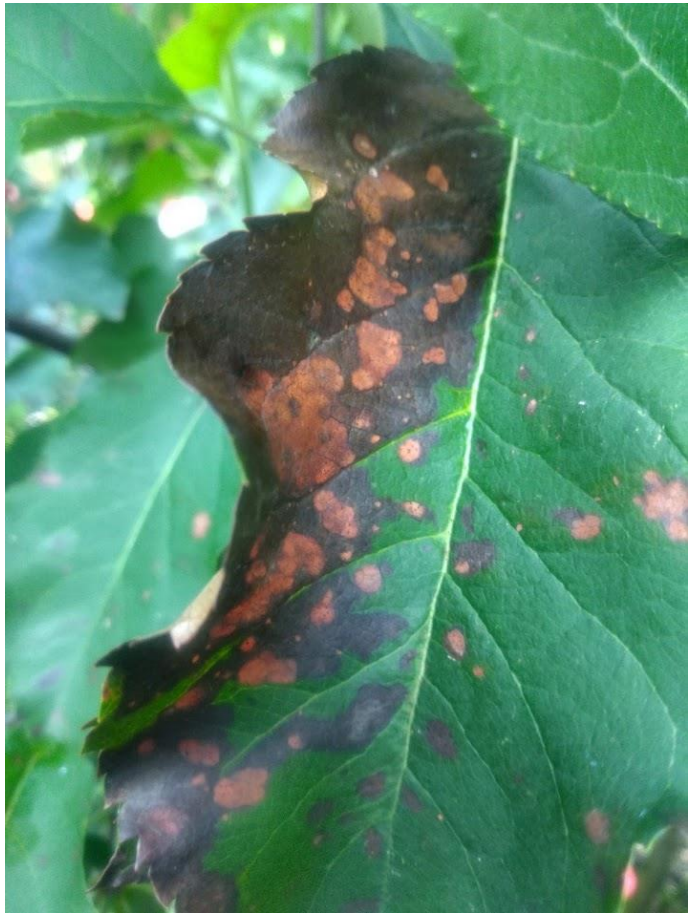


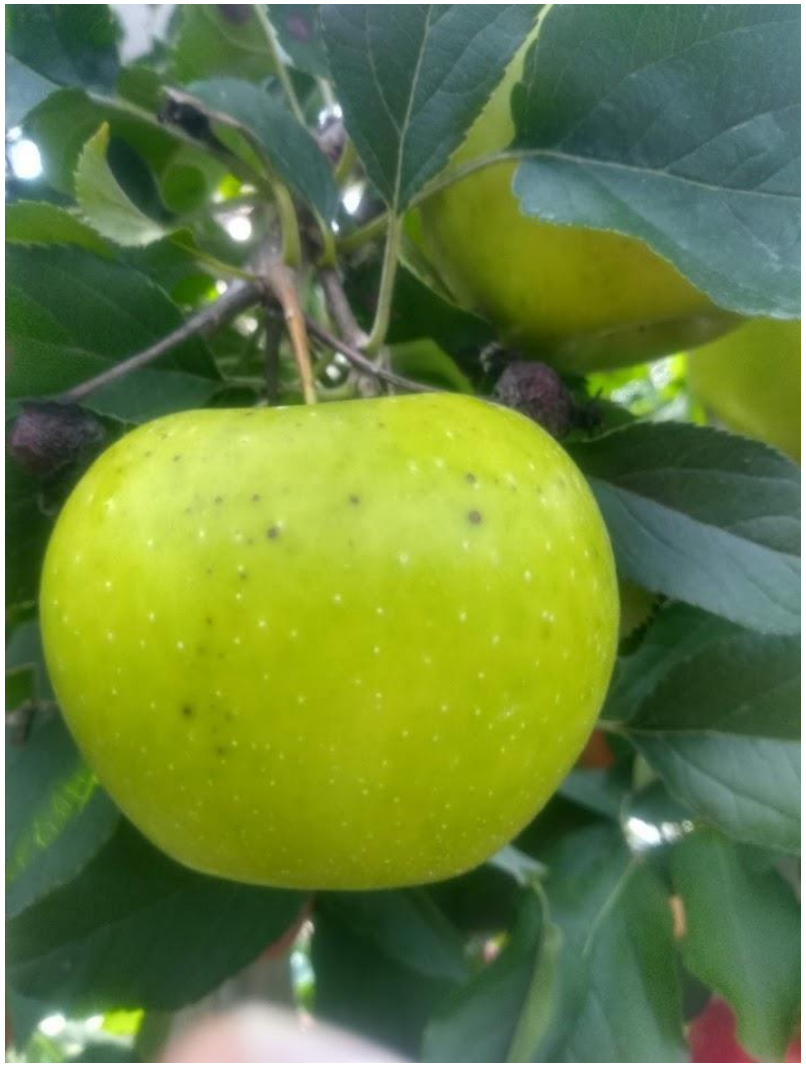
Fig. 4 – Post infection strategies adopted by *Colletotrichum* species A: Intracellular hemibiotrophy B: subcuticular, intramural necrotrophy C: localized hemibiotrophic infection with multilobed primary hyphae D: Extended hemibiotrophy. C: conidia, AP: appressoria E: epidermal cells, M: mesophyll cells, PH: Primary hyphae, SE: Secondary hyphae, MLPH: multilobed primary hyphae.

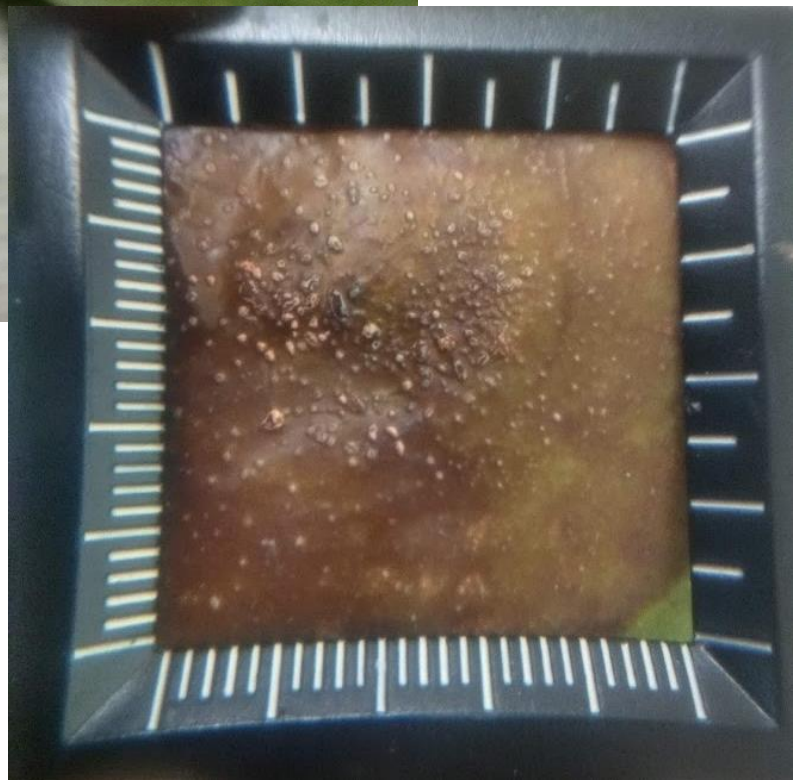
Diverse sintomatologie



Defogliazione precoce

Granny smith

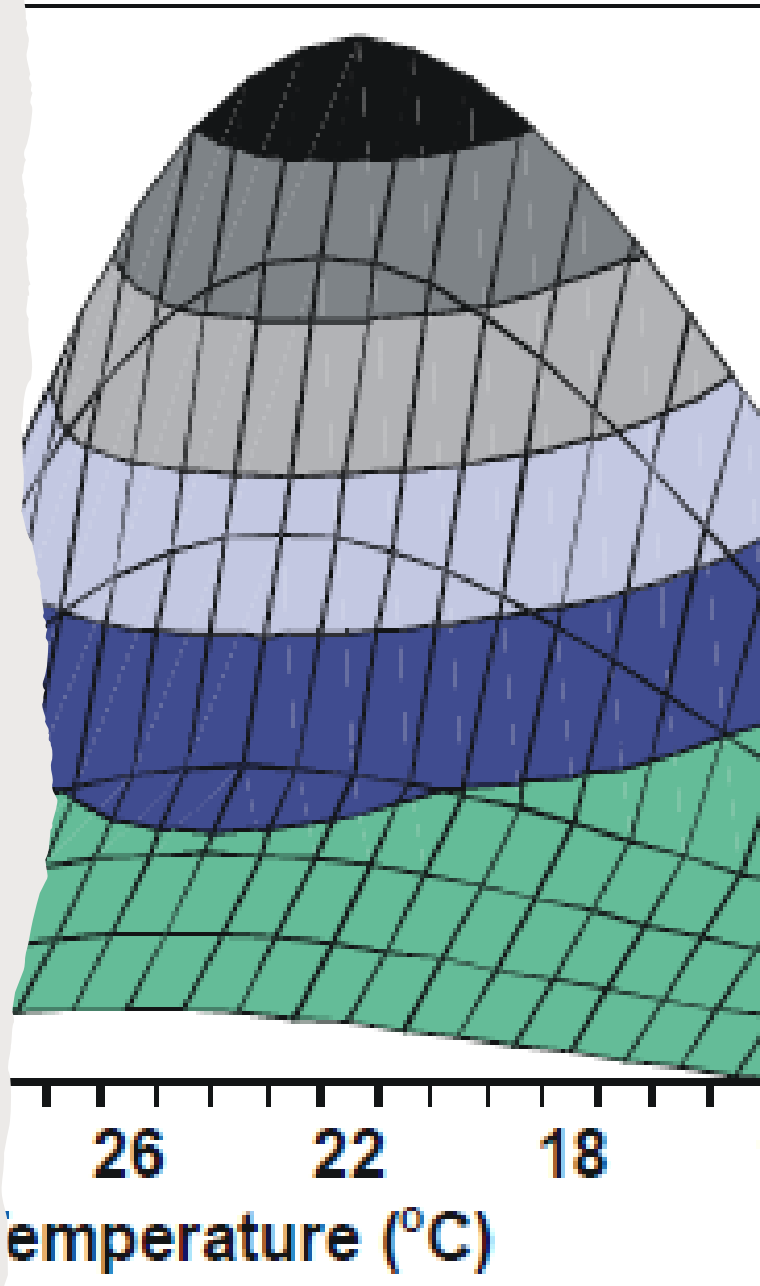




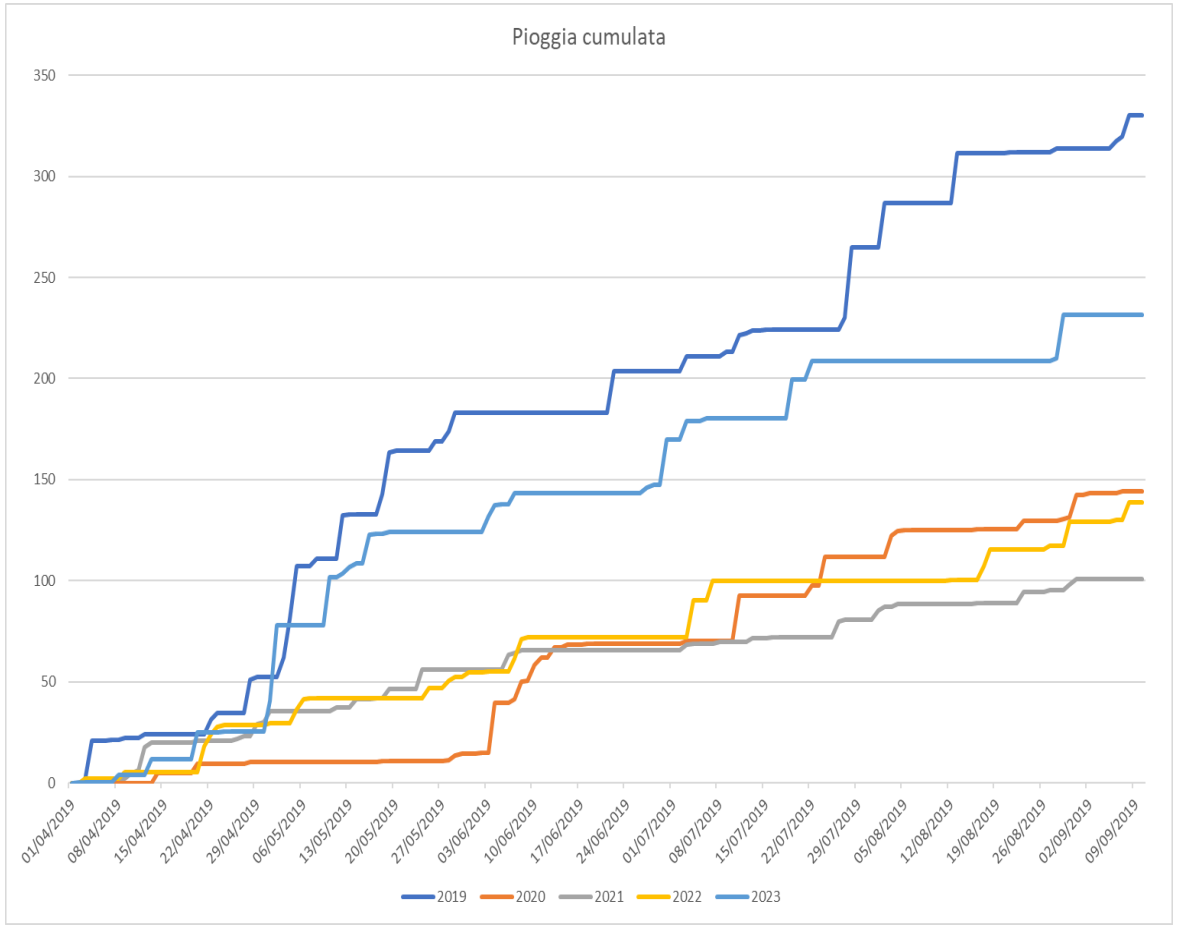
GLS (Glomerella Leaf Spot)

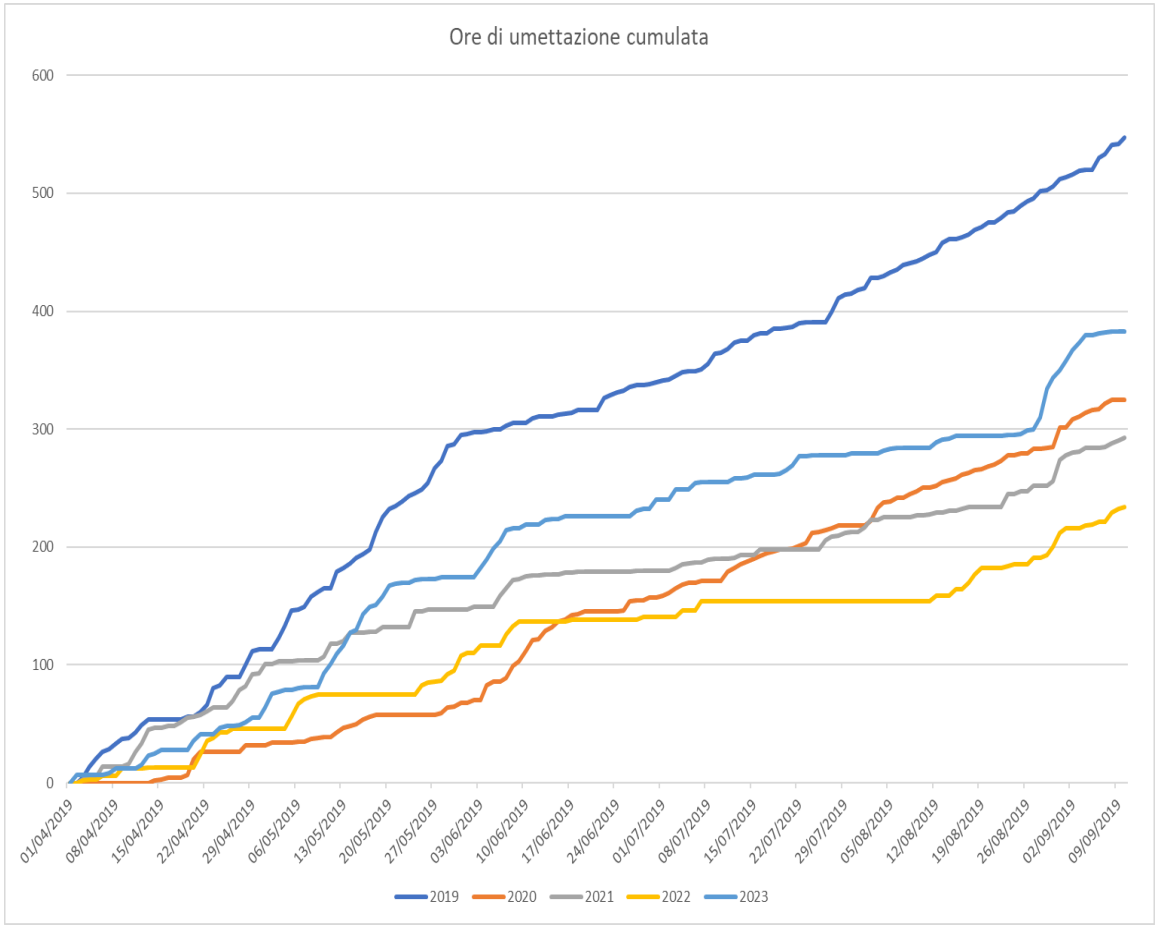
INFEZIONE

- **Temperatura >14°C**
- **T.opt. 26°C**
- **T.max 35°C**
- **Bagnatura fogliare da 10 ore a 32 ore**



Clima (Portomaggiore – FE)



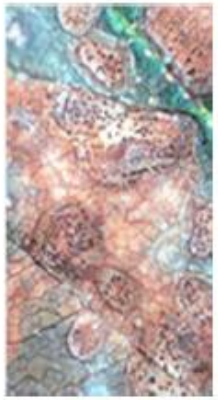


Sopravvivenza

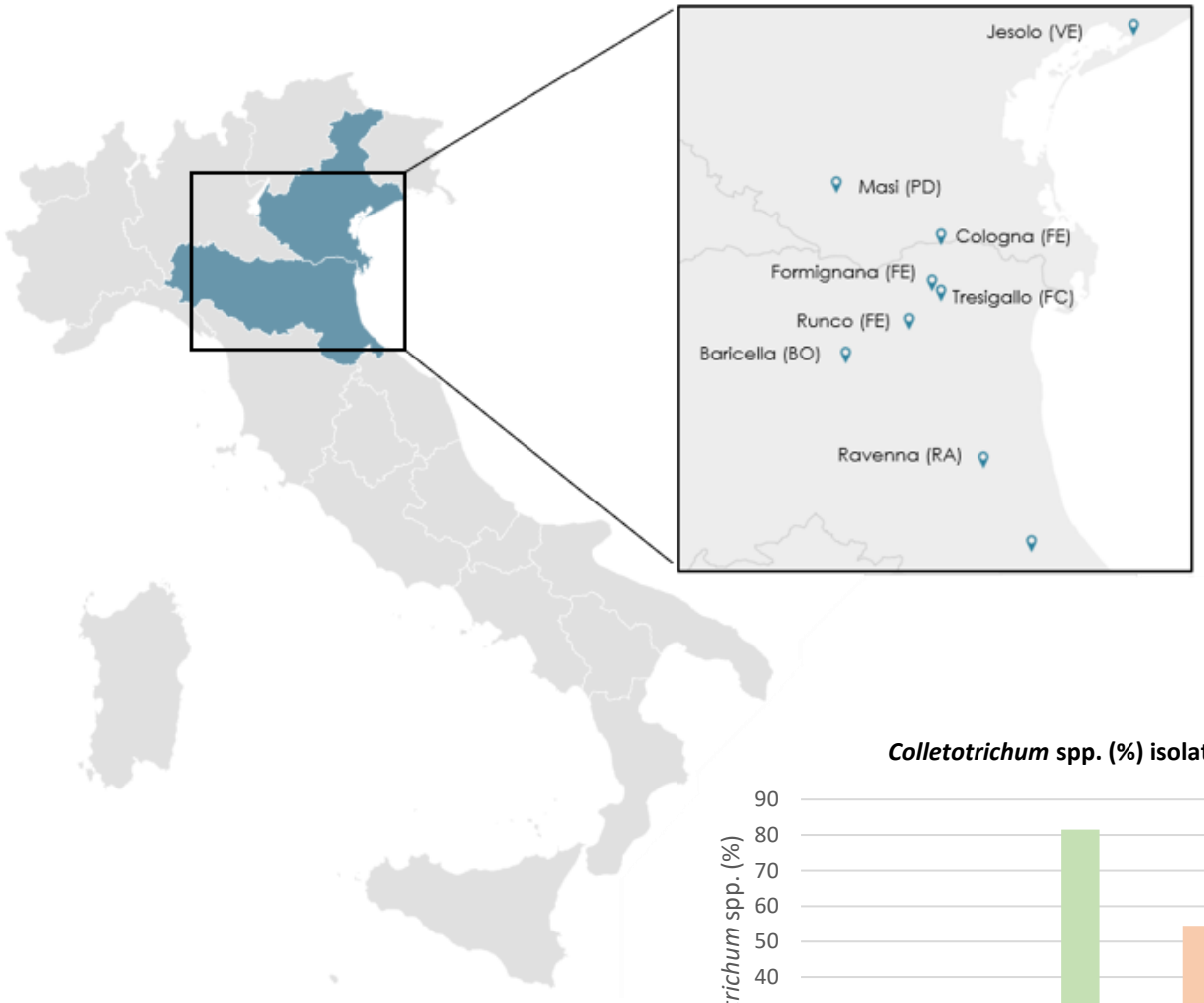
gemme (conidio)
Piccoli cancri (conidio)
Foglie infette cadute a terra (peritecio)

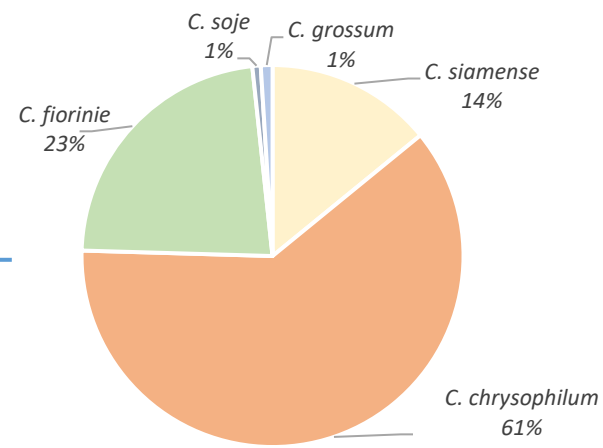
J. I. Boneti

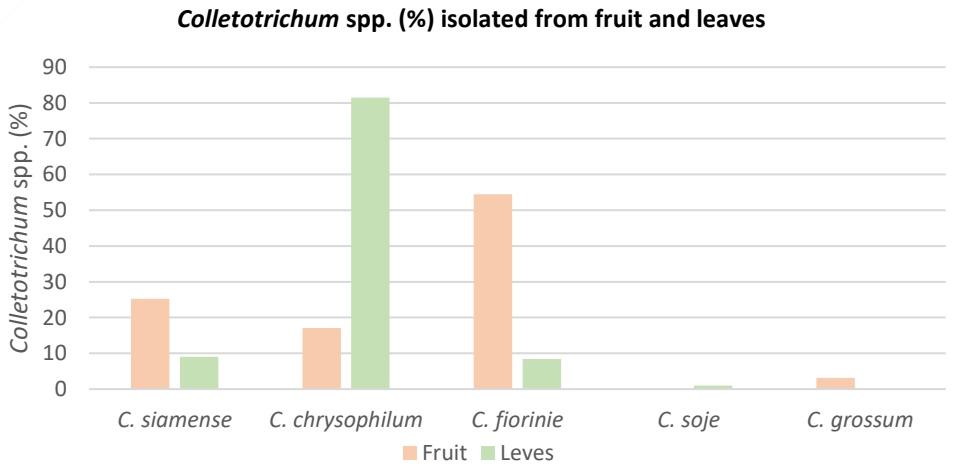


Sampling and isolations



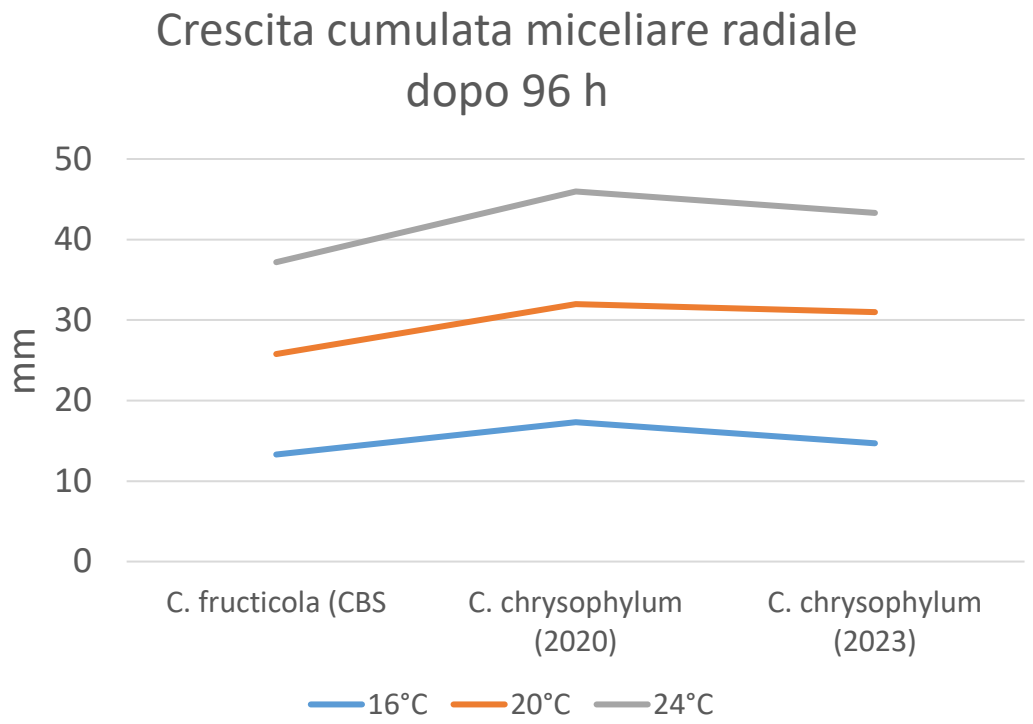




Fonte: UNIBO

RISULTATI

Effetti della temperatura sulla crescita di *Colletotrichum*



Simulazione della sintomatologia durante la shelf-life

La simulazione dello shelf life per osservare un possibile sviluppo dei sintomi **non ha mostrato una progressione significativa della loro espressione**. Solo in due dei 10 frutti con sintomi di GLS è diventata visibile un'altra macchia durante i 54 giorni a temperatura ambiente. Due dei frutti (uno con e uno senza sintomi di GLS) hanno mostrato un leggero marciume nella zona del peduncolo 34 giorni dopo la raccolta, che si è esteso all'intera mela dopo 54 giorni.

GLS (Glomerella Leaf Spot)

CRITICITÀ

Epidemiologiche

- individuazione dei sintomi precoci
- Individuazione dei momenti infettivi più importanti

Fitoiatriche

- Difesa: individuazione delle s.a. maggiormente performanti (sia in Bio che in Integrato)
- Definizione di strategie di difesa possibilmente a basso impatto
- Sanitazione

Difesa

- Il rischio infettivo ha inizio generalmente dalla fine fioritura in poi in funzione delle condizioni climatiche predisponenti caratterizzate da alta frequenza di piogge e dalla prolungata bagnatura fogliare. I trattamenti dovrebbero pertanto essere eseguiti preventivamente seguendo l'andamento pluviometrico con cadenze non superiori a 10 giorni.
- Mancozeb, metiram ziram,
- captano,
- Dithianon
- QoI
- fosfito di K
- fluazinam.